CHAPTER 1

INTRODUCTION

1.1 STUDY BACKGROUND

Corrosion can be defined as degradation of quality properties in a material due to the chemical reaction between the components of the material and the surrounding. Metal corrosion results in the deterioration of functional properties such as mechanical properties and mechanical strength.

There are many techniques in measuring corrosion rates such as weight loss and electrochemical method. As a result of the development of the fundamental understanding of corrosion electrochemistry, fast and accurate potentiostats, and computer technology, a suite of electrochemical techniques exists for the study of corrosion. These techniques provide the technologist with the ability to monitor corrosion rates in service, giving early warning of conditions that could adversely affect performance and integrity. They also provide the experimentalist with the ability to determine corrosion rate with high sensitivity, assess rate controlling mechanisms, and in some cases make life predictions. Furthermore, variations in electrochemical techniques and in-novative cell designs allow researchers to probe mechanisms and develop new and improved materials.

1.2 PROBLEM STATEMENT

A method to interpret corrosion current based on an electrochemical reaction is, recently, still under review. Tafel extrapolation, and linear polarisation (LPR), for example, are valid for any certain conditions, which are the electron transfer is fast, reversible reaction, similar accessibility, and equal diffusion coefficients. Oftenly, those conditions are difficult to achieve which lead to mis calculation and result uncertainties in prediction corroson rate. Thus, calculating uncertainty in measuring corrosion rate is important to give correction factors to the experimental data. It can also predict the erroneous data recorded from laboratory test.

1.3 OBJECTIVES

The objective of the study is to compare the experimental data recorded by several corrosion test, which are: LPR, Tafel and Weight Loss method. This research is also aimmed to investigate the uncertainties of those corrosion experiments in the same time calculate their erroneous data of corrosion with assuming conditions of pH, temperature, and acetic acid are to be constant.

1.4 SCOPE OF STUDY

1) The material used is carbon steel X52.
2) Corrosion rate of the material used is measured by weight loss method, and electrochemical technique (Linear Polarization Resistance and Tafel method.
3) The corrosion rate of each method are analyzed and compare to get the most efficient and lowest uncertainty.